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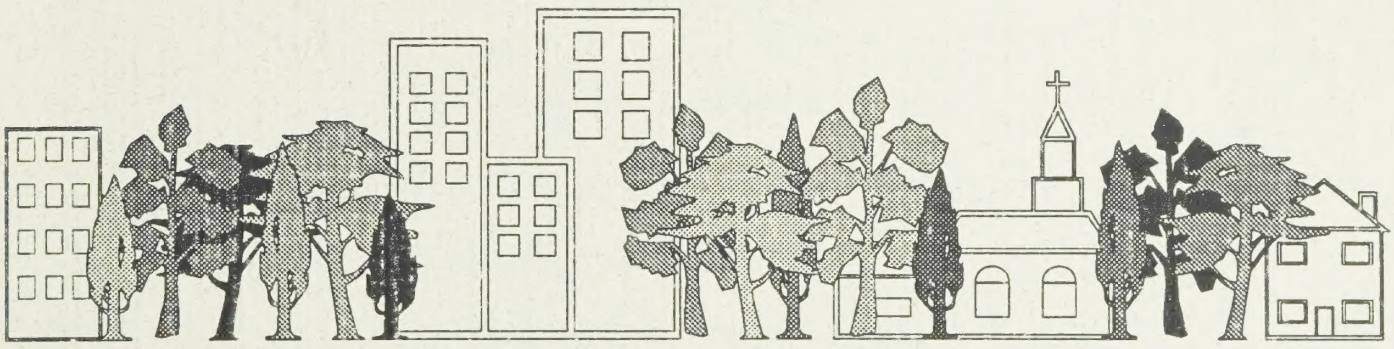
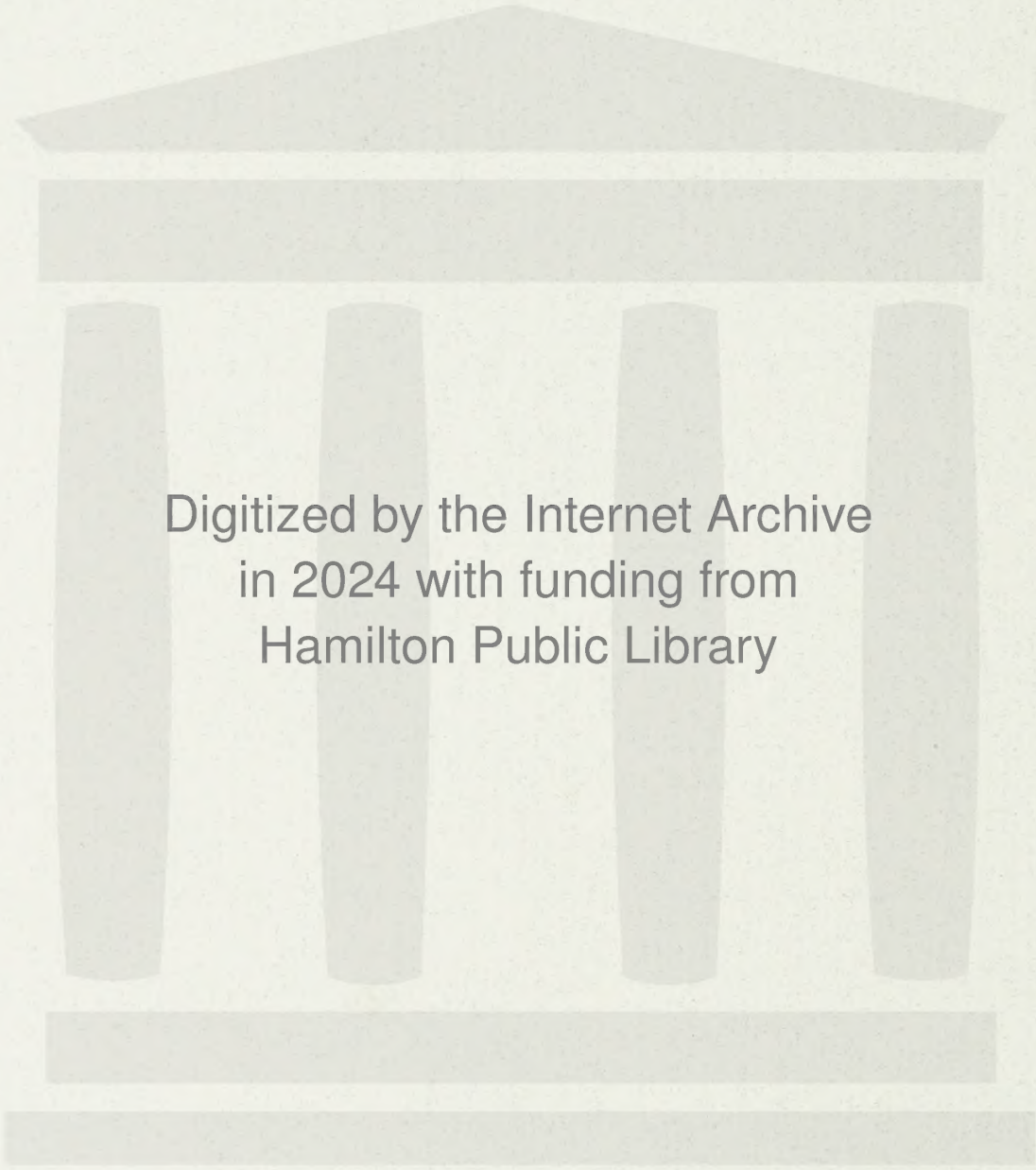
State of the Environment 1994 Update



Regional Municipality of Hamilton-Wentworth
Planning and Development Department
August, 1994

Volume II: Programs, Policies and Activities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State of the Environment Update 1994
Vol. II : Programs, Policies and Activities
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State of the Environment Update 1993
Programs, Policies and Activities

1 Introduction

Information available on current environmental conditions are examined in State of the Enviornment Update 1993: Environmental Indicators. This document focuses on the activities carried on by the Region, Area Municipalities, Province, Federal Government and other agencies that are directed at improving the environmental conditions found in Hamilton-Wentworth. Since this is a Regional document, the emphasis is on local remedial activities that involve Regional departments and that are limited geographically to the Region and nearby areas. However, some information has been provided on programs that will have an impact on air and water quality across southern Ontario.

2 Air

Adverse conditions in the atmosphere are caused by a wide variety of human activities. Emissions directly or indirectly resulting from the manufacturing of products, the heating and cooling of households, institutions and commercial establishments, the movement of people and cargo, and the carrying on of day-to-day life in the modern age all contribute to problems like the build-up of carbon in the atmosphere, ground-level smog, and the dispersal of pollutants like sulphur compounds across wide areas. Any strategy used to successfully address atmospheric pollution problems will have to incorporate a wide range of measures to deal with all of these types of activities. Because of the need for a comprehensive approach when dealing with atmospheric issues and jurisdictional restrictions, the Provincial and Federal governments are primarily responsible for dealing with the regulation of activities that cause air quality problems and for initiating programs that reduce emissions to the atmosphere of pollutants.

At the local level one of the most important areas where the Regional and Area Municipalities can have a significant effect is through transportation planning and public transit provision. In Ontario, the transportation sector accounts for more than a quarter of all of the energy used and approximately the same fraction of air pollution emitted.[1] The Region can play a role in reducing air pollution that results from transportation sector emissions by promoting means of transportation other than the automobile, particularly when public transportation vehicles use alternative energy sources.

The use of alternative fuel public transit vehicles usually provides two major advantages over conventional single-passenger automobile use: First, less energy is used and less air pollution produced through the use of even traditional buses for commuting because of the inherent efficiency of public transit (diesel buses produce about 40 percent as much carbon dioxide as do single-occupancy autos per passenger mile).[2] And second, alternative fuel vehicles produce even less emissions than conventional vehicles. Better still, of course, is for people to walk or bicycle to their destinations rather than to use vehicles.

2.1 Provincial Initiatives

2.1.1 Draft Ozone Protection Regulations

One of the areas that the Province can have a major impact on air quality and the state of the atmosphere is through the regulation or prohibition of activities and processes that cause emissions of damaging gases and particulates. Under the provisions of the Environmental Protection Act, the Minister of Environment and Energy is capable of issuing regulations that control particular substances and processes.

The Minister has recently issued a draft regulation that would prevent the release of fluorocarbon refrigerants into the atmosphere. Fluorocarbons, including chlorofluorocarbons (CFCs), are chemicals that are commonly used in air conditioning and refrigerator equipment. Unfortunately, although these chemicals provide a very useful purpose when still trapped in refrigeration equipment, once released into the environment fluorocarbons can contribute to the rapid depletion of the ozone layer. The ozone layer protects people, wildlife and vegetation from ultraviolet radiation emitted from the sun. When the ozone layer is diminished in size, cataracts and skin cancer in people become more common, and agricultural crops and other types of vegetation are adversely affected. It has been estimated that past releases of chemicals like chlorofluorocarbons (used in refrigerators since the 1930s) have already contributed to shrinkage of the ozone layer by between 1 and 3 percent, and the damage continues to take place.[3]

Under the provisions of the new regulation, no one will be allowed to simply release fluorocarbon refrigerants into the atmosphere from existing systems, people who repair and refill refrigeration equipment will have to be specially trained and licensed, and chlorofluorocarbons will be completely phased out of use in new motor vehicle air conditioning systems. It is the goal of the Ministry of the Environment and Energy to reduce the use of CFCs from the 1986 level by more than half in 1993, and to cooperate with the Federal Government in eliminating the import and export of CFCs to or from Canada by 1996.

2.1.2 Comprehensive Air Quality Studies

Although the Province has been involved in air quality monitoring for decades (the information contained in the preceding section was provided by MOEE), it has only recently become involved in large-scale, comprehensive studies to evaluate the sources and effects of air pollution. In the past, efforts have concentrated on limiting the amount of pollutants discharged into the air from major point sources such as incinerators, manufacturing processes, and refineries. In these cases the indicators used tended to be levels of standard pollutants like suspended particulates and sulphur dioxide, and linkages between human health and the level of air pollution were often only badly understood.

The Ministry of Environment and Energy has recently launched an initiative to more comprehensively analyze air quality and the sources and effects of air pollution. Windsor was the site of the first of a series of planned studies of air quality in urban areas across Ontario. Hamilton should soon be included in a similar comprehensive study. The Windsor study consisted of six areas of investigation:

1) **Ambient Monitoring**. MOEE undertook more extensive monitoring of air quality across Windsor. This provided better information on the geographic dispersal of pollutants.

2) **Mobile Monitoring**. MOEE used a specially-equipped vehicle to collect air quality samples in a variety of locations. This information is used to supplement the information collected at the established sampling sites.

3) **Personal Sampling**. Volunteers working for MOEE used portable air samplers to collect basic air quality information at ground level as they went about their daily routines. This allowed investigators to evaluate the level of exposure to air pollution that average people are exposed to on a day to day basis.

4) **Soil and Vegetation Sampling**. Samples were taken from suburban and urban locations (parks, gardens, etc.) and then analyzed for contaminants normally transported through the air. These samples provide an indication of the gradual build-up over time of pollutants in the environment from air pollution.

5) **Modelling and Emissions Inventory**. MOEE attempted to model the sources of air pollution. Sources like vehicle and industrial emissions were analyzed and modelled to produce an understanding of where air quality problems are actually started.

6) **Risk Assessment**. Studies were undertaken to evaluate the impact of air quality problems on human health. Once a better understanding of these impacts is developed, policies can be put in place to reduce the level of priority pollutants found in densely populated urban areas.[4]

The Windsor study, like the other studies that will follow, monitored the level of a much larger number of compounds found in the air. These included chlorinated solvents like trichloroethylene, common volatile organic compounds like benzene and formaldehyde, metals like arsenic and cadmium, and a number of polycyclic aromatic hydrocarbons. Many of these compounds could have a significant and adverse effect on human health, so monitoring their presence will be an important element in health protection efforts. The Hamilton study will expand on the Windsor study by making a total environment risk assessment based on a multi-media approach to the ecosystem. Air, water, and terrestrial-related elements will be studied.

2.2 Regional Initiatives

2.2.1 Public Transit (Hamilton Street Railways)

During the 1980s use of public transit declined in Hamilton-Wentworth. This trend was due more to personal preferences, increased movement to suburban areas by households and businesses, and the growth of dual-career families than to any short-comings of the public transit network or services. Efforts to improve air quality in Hamilton-Wentworth and elsewhere through the promotion of public transit will as a result have to address issues such as the density of new developments, the provision of more mixed-use areas, and the perceptions of people regarding the use of public transit, if people are going to leave their cars at home and use buses more frequently.

In the meantime, the Hamilton Street Railway has moved in the direction of significantly reducing emissions of pollutants into the atmosphere by implementing a program of systematically replacing conventional diesel-powered buses with natural gas-powered buses. Forty of HSR's fleet of 210 buses are now powered by natural gas, and by 2005 it is projected that all or virtually all of the buses will be powered by natural gas. Although the burning of natural gas still produces some air pollution, the amount of pollutants produced is much lower for natural gas buses than for conventional diesel buses.

2.2.2 Regional Bicycle Network Implementation Programme

In May, 1992 Regional Council adopted a Master Plan for developing a bicycle transportation network consisting of bike routes, bike lanes, and bike paths. The Region has started to implement the network and priority alignments have been chosen that would benefit both commuter and recreational cyclists. The Region has been working with the Area Municipalities and the Hamilton Region Conservation Authority in the development and implementation of the Plan.

2.2.3 Regional Transportation Planning Efforts

The Regional Chairman's Task Force on Sustainable Development recently completed several years of work by providing a detailed set of recommendations to Regional Council on how to develop a society in Hamilton-Wentworth that is more economically, environmentally and socially sustainable. A number of these recommendations directly or indirectly address the problem of air pollution through Regional policies and programs. These include proposed improvements in urban design and land-use planning, a renewed emphasis on modes of transportation that are more energy efficient, and initiatives to limit the amount of discharge of gases and particles into the atmosphere from industrial, commercial, institutional, and residential activities.

residential activities.
The new draft Official Plan, which provides policy direction for land use in the Region, includes policies which promote compact mixed areas (which allow people to walk rather than drive to shop or get to work), limit the expansion of suburban sprawl, and increase the amount of infill development in existing urban areas. If successfully implemented, the draft Official Plan would reduce the amount of time people spend in automobiles, effectively reducing the amount of pollutants like carbon monoxide and nitrogen dioxide released into the air. Higher densities and mixed uses tend to increase the use of public transit, reduce the need for automobile trips, and greatly promote pedestrian movement.

Another planning initiative that has been guided by the recommendations and vision of the Sustainable Development Task Force is the Regional Transportation Plan. Presently being developed, the Transportation Plan will be the first comprehensive transportation plan prepared in Hamilton-Wentworth in approximately twenty years. The new plan's goals include reversing the downward trend of public transit use in older areas, introducing viable public transit to newer areas, prioritizing the use of limited road construction funds, promoting pedestrian and bicycle movement, and reducing motorized-vehicle traffic intrusion in residential neighbourhoods. The first phase of the study has already been completed, and the study should be completed soon.

Endnotes

1 Ontario Round Table on Environment and Economy, Transportation Sectoral Task Force: (draft report) - October, 1991, pg. 34

2 Ontario Round Table on Environment and Economy, pg.51,

3 Ontario Ministry of the Environment and Energy, A Draft Regulation to Prevent the Release of Fluorocarbons Refridgerant: Backgrounder 1993

4 Ontario Ministry of the Environment and Energy, Background : Windsor Air Quality Study, (information bulletin), Summer 1993.

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Planning and Development Department, Region of Hamilton-Wentworth, Hamilton-Wentworth Region Official Plan (draft) September, 1993.

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Victor Ford and Associates Inc., Bicycle System Consultants, R.G.P. Transtech, Transportation Engineers, Hamilton-Wentworth Regional Bicycle Network Study, May, 1992.

3 Water

3.1 Lake Ontario

3.1.1 Lake Ontario Toxics Management Plan

Concern over the levels of toxic chemicals found in Lake Ontario has led to a series of actions by the Canadian, U.S., Ontario, and New York State governments to reduce or limit the discharge of these chemicals into the lake and its tributaries. In 1987 the Ontario Ministry of the Environment, Environment Canada, the U.S. Environmental Protection Agency, and the New York State Department of Environmental Conservation signed an agreement that committed these agencies to developing and then implementing a plan to deal with toxic materials in Lake Ontario.

By 1989 a plan had been developed, called the Toxics Management Plan for Lake Ontario, that would reduce toxic pollution to a level at which lake water could be used for unlimited human consumption and at which the reproductive systems of the most sensitive native species would not be affected. The plan provided four major objectives:

i) Reductions in toxic inputs driven by existing and developing programs.

ii) Further reductions in toxic inputs driven by special efforts in geographic areas of concern.

iii) Further reductions in toxic inputs driven by lake-wide analyses of pollutant fate.

iv) Zero discharge. [1]

To date, a number of actions have been undertaken to implement the plan. These include:

* A list of priority contaminants has been developed by Environment Canada, the U.S. EPA, MOEE, and NYSDEC. Studies are ongoing to determine whether more contaminants should be added to the list of nine currently in place. Testing of contaminant levels in sediment, the water column, fish and biota continues.

* Scientists are developing mathematical models to explain the connection between loadings of contaminants with the levels of contaminants found in sediments, fish, and the water column.

* The Ontario Ministry of Environment and Energy has begun to implement and enforce a range of stringent regulations for municipalities and industries under the "Municipal Industrial Strategy for Abatement" (MISA) program. Pulp and paper plants, petroleum refining plants, municipal sewage treatment plants, and other major polluters are being forced to reduce and in some cases eliminate their discharges of priority contaminants into Lake Ontario.

* The Canadian Government established a set of regulations in late 1992 for pulp and paper mills that will force the industry to implement changes that will prevent the formation and release of toxic dioxins and furans. Five mills in the Lake Ontario basin will be affected. New regulations from the Canadian Government dealing with the export and import of toxic chemicals could also have an impact on reducing the discharge of priority contaminants into the lake.

* Environment Canada is spending $25 million on the Great Lakes-St. Lawrence Pollution Prevention Initiative, which is focused on convincing businesses, government agencies, and households to reduce their use of toxic contaminants.

* Erie County, New York and the Region of Hamilton-Wentworth are sharing information to reduce discharges of hazardous wastes by small industries into the Great Lakes through pollution prevention initiatives.

* The U.S. EPA initiated a pilot program called "Clean Sweep" in Erie County to assist farmers in safely disposing of their stores of banned and unregistered pesticides.

* The U.S. EPA and NYSDEC have jointly begun to undertake multi-media (air, water and land) inspections of industrial and municipal facilites in the Lake Ontario watershed. These inspections will focus on the identification and elimination of releases of priority contaminants into the environment.

* The U.S. EPA and NYSDEC have begun to reallocate resources to Great Lakes clean-up activities such as pollution prevention, source identification and elimination, public education, and expedited cleanup of targeted wastes.

3.1.2 Lake Ontario Lakewide Management Plan

In addition to the Lake Ontario Toxics Management Plan, a more comprehensive plan is being prepared to deal with environmental issues associated with Lake Ontario. The Great Lakes Water Quality Agreement, as amended in 1987, requires that plans be developed for each of the Great Lakes. These plans will be similar in nature to the Remedial Action Plan prepared for Hamilton Harbour. The development of each plan will consist of a review of existing problems, an identification of the sources of these problems, an investigation of the alternative remedial actions available to deal with these problems, and the preparation of a strategy to implement the remedial actions chosen.

The plan, called the Lake Ontario Lakewide Management Plan (LaMP) for Critical Pollutants, will attempt to examine the entire ecosystem from the smallest micro-organisms to the human population to identify and then reduce or eliminate critical pollutants. Like the Hamilton Harbour Remedial Action Plan, the LaMP will deal with issues associated with the degradation of important habitat for fish and wildlife, with the levels of nutrients found in the water column, and with the population levels of a wide variety of species found in the lake.

The LaMP will also be similar to the Hamilton Harbour RAP in that it will be developed in stages, each of which will be reviewed by the International Joint Commission. A stage I report identifying existing problems, including the determination of critical pollutants and their estimated impact on fish, wildlife and humans, should be prepared and reviewed by April, 1995. A stage II report, which will provide loading targets for critical pollutants as well as the rationale and criteria used to arrive at those targets, should be prepared by December, 1995. A final document, referred to as the Stage III report, should follow in December, 1996. This report will provide an evaluation of existing remedial programs, an identification of remedial actions that should be undertaken, and a plan for the implementation of these recommendations.

3.2 Hamilton Harbour and Cootes Paradise

Although much progress has been made in limiting the pollution discharged directly into the Harbour from industrial and municipal sources, Hamilton Harbour remains on the International Joint Commission's list of Areas of Concern, and will not be removed from that list until a wide range of issues including contaminated sediment, water quality, and the state of fish and wildlife, are successfully addressed.

As part of the overall efforts to improve the state of the Great Lakes, governments on both sides of the border have worked to establish processes to address environmental issues in particular geographic areas. Under the terms of the Revised Great Lakes Water Quality Agreement of 1978 and amendments included in 1987, each federal government and the respective state or provincial government is required to formulate and implement a plan to address the environmental problems of each Area of Concern that had been identified by the International Joint Commission. Hamilton Harbour was one of the 42 sites identified by the IJC as an Area of Concern because of the degraded state of its waters, sediments and associated fish and wildlife, and in the mid-1980s the Canadian and Ontario Governments initiated a process to develop a plan to coordinate actions to improve the state of the Harbour.

In 1986 the Ontario Ministry of Environment and Energy and Environment Canada established a stakeholder group to advise the agencies on how to best develop a plan to address Hamilton Harbour's environmental problems and opportunities. This stakeholder group was later charged with determining the final goals, principles, and remedial actions that would be necessary to eliminate the Harbour's status as an IJC Area of Concern. Assisted by a technical writing team and research capabilities provided by Environment Canada and the Ministry of Environment and Energy, the stakeholder group went on to prepare the draft Hamilton Harbour Remedial Action Plan, which was circulated in December, 1991. This plan

provides:

a) clear and precise goals consistent with the general and specific objectives of the Great Lakes Water Quality Agreement,

b) an evaluation of remedial measures already in place,

c) an evaluation of alternative, additional remedial measures required to restore beneficial uses with a schedule for their implementation (at this stage only the technically feasible schedule is described, rather than a firmly committed and funded schedule),

d) the beneficial uses that <u>will not</u> be restored (if any) and why they will not be restored,

e) the description of a monitoring program to track the effectiveness of the remedial works, and a

f) listing of the agencies or persons responsible for implementation of the measures that make up the Plan. [2]

Many of the remedial measures set out in the Plan have actually been initiated even as the RAP process has been underway. As a result, significant progress has been made in working towards many of the goals included in the Plan. Much of the progress achieved has been attained as the result of the efforts of the Region of Hamilton-Wentworth, which has spent very large sums of money to reduce discharges of contaminants and nutrients from Regional sewers and sewage treatment plants into Cootes Paradise and Hamilton Harbour. The City of Hamilton has also been in the forefront of efforts to improve the Harbour, investing a significant amount of money in the development of the Pier 4 and the Hamilton Waterfront Parks.

During the preparation of the plan, the stakeholder group comprising representatives of industry, local government, federal and provincial agencies, local environmental groups, citizens groups, and other interested parties, worked together to develop the objectives of the plan. The stakeholders were assisted by a technical team composed of Federal and Provincial scientists which assembled and analyzed scientific data and evaluated technical solutions to the Harbour's problems. The RAP process has now been split into two components for the implementation phase: the Bay Area Implementation Team (BAIT), and the Bay Area Restoration Council (BARC).

BAIT is made up of the agencies and companies that will actually implement the recommendations included in the plan. The Provincial Ministry of the Environment, the Region of Hamilton-Wentworth, Stelco, Dofasco, the Federal Department of Fisheries and Oceans, Environment Canada, the Royal Botanical Gardens, and the Hamilton Region Conservation Authority are some of the organisations that are part of BAIT. The efforts of these organisations will be coordinated by the BAIT office, which is now being established with funding from the Federal and Provincial Governments.

BARC is made up of representatives of special interest groups, citizen groups, and interested individuals, and will primarily perform a monitoring function to ensure that the organisations comprising BAIT successfully implement the recommendations of the RAP plan. BARC also plays, and will continue to play, a role in publicizing the RAP process and making the public aware of the importance of the Harbour and the efforts required to improve the state of Hamilton Harbour and Cootes Paradise. BARC publishes a newsletter updating readers on the progress of the plan's implementation, and organises public meetings and special activities to raise the profile of the RAP process.

The following sections (3.2.1 through 3.2.6) describe how a number of particular Remedial Action Plan recommendations have recently been implemented. The plan has 50 major recommendations, which range from increasing the oxygen level in the Harbour's waters to minimizing agriculture erosion to restoring submerged vegetation. The following information has been included so that an indication of the progress that has been made on some of the most important recommendations is provided. It should be noted that although a great deal of progress has been made on the state of the Harbour, there still remains a large number of challenges that have to be met by the variuos levels of government, industry, and the general public.

3.2.1 Progress on RAP Recommendation #1

Recommendation: To reduce nutrient (phosphorus, nitrogen, ammonia) and suspended solids loadings to Hamilton Harbour and Cootes Paradise through improvements to municipal sewer systems and sewage treatment plants.

Agencies Responsible

Regions of Hamilton-Wentworth and Halton, with financial assistance from OMEE and technological assistance from Environment Canada.

Tasks

i) Reduce loadings from the Woodward Avenue Sewage Treatment Plant (H-W) and the Skyway Sewage Treatment Plant (Halton) to reflect specific technical targets of the Remedial Action Plan.

ii) Eliminate or greatly reduce combined sewer overflows to Cootes Paradise and Hamilton Harbour with first priority on Cootes Paradise and western Hamilton Harbour.

iii) Reduce the concentration of phosphorus in the Dundas and Waterdown STPs to less than 0.1 parts per million (ppm).

Progress to Date

* Combined sewer overflow retention facilities have been completed at Greenhill Avenue at Redhill Creek (west side - 70,000 m3 volume), at James Street at Guise Street (4,000 m3 volume), and at Strachan Street (20,000 m3 volume). These facilities will retain polluted water normally released into the Harbour during storm events because of an overloading of the combined storm and regular sewer systems. Once the heavy flows due to the precipitation event have subsided, the wastewater retained in the tanks will be pumped back into the system to be treated at the Woodward STP. The completed retention facilities have cost the Region approximately $18,000,000. For future works the only item definitely approved at this time is design funds for a facility at the intersection of King Street and Highway No.403, but the construction start date has not yet been established because of budget restraints.

* The Municipal Industrial Strategy for Abatement (MISA) program was initiated in the Regional Municipality of Hamilton - Wentworth (RMHW) in 1989. Under the program, industrial waste water discharges have been regularly monitored and analyzed. Elements of this provincial program are now being implemented in the Region. Further recommendations have also been proposed by Hamilton - Wentworth as a result of the demonstration program. New initiatives by RMHW will allow closer examination of the discharges of individual industries into the Regional waste water collection system.

Although the number and quantities of chemical compounds, petrochemical byproducts, organic and inorganic wastes, and suspended particles presently being discharged by the Region's industry are diverse and extensive, many have been identified and tested for by Regional Laboratory staff at the treatment plant. For many years, largely as a result of the lack of solid Provincial directives or regulations demanding more intensive analysis, Regional employees were concerned only with loadings of ammonia, phosphates, total suspended solids (TSS) and biochemical oxygen demand (BOD) to the waste water treatment facility. An increased level of awareness of the effects of toxic pollution, however, have led Provincial and Regional environmental staff to determine when possible or estimate the extent of a wide range of loadings to Hamilton Harbour, the receiving body for Hamilton-Wentworth's and Burlington's treated sewage.

Regional staff, for instance, have been involved in testing for the following loadings being discharged from the Region's collection systems:

Cyanide	Selenium
Phenols	Zinc
Phosphorus	Oil
NH3-N	PCBs
Arsenicy	-BHC
Cadmium	DDT
Chromium	Organic Nitrogen
Copper	Nitrate
Iron	Volatile organic contaminants

Manganese	Semivolatile organic contaminants
Nickel	Organic nitrogen
Lead	Nitrate
Nitrite	BOD
	COD

These types of substances can have a profoundly deleterious effect on aquatic vegetation, fish, drinking water, and water recreation.

The difficulties inherent in dealing with excessive levels of household sourced biological waste is relatively minor in comparison with problems created by toxic chemical discharges to the collection system in the form of industrial by -products or hazardous household cleaners and other consumer chemicals. Relatively small quantities of highly toxic materials are difficult to isolate, and when these toxins can be removed from the system the processes required are often prohibitively expensive. In some cases the waste water treatment plant can remove the bulk of the pollutant once the problem has been detected. In many other cases the treatment plant is unable to initially detect or unable to take remedial actions because of the nature of the pollutant. Small quantities of materials like cyanide or polychlorinated biphenyls (PCBs) can contaminate large quantities of water but may be difficult to detect or isolate. Rather than trying to remove these contaminants once they have become mixed with the huge volumes of waste water flowing through the collection system, elimination of the discharge of these toxins at source is the solution. The domestic component of these pollutants is now being monitored annually.

Results from extensive testing in Hamilton-Wentworth under the auspices of the MISA program piloted in the Region and four other communities in Ontario and completed in April, 1992, has produced a substantial database on the composition of the wastes being discharged into the sewage system. (See below.)

The Region's Sewer Use By-law R89-049 is modelled after the Provincial Model By-law and provides for more comprehensive control of discharges to the Regional sewer system. Although the program will eventually be implemented in all of the province's municipalities, the Region is one of only five pilot sites that has fulfilled elements of the program. Remaining regulatory elements are expected to be implemented by the Region when MOEE development is complete.

While in the past little concern was given to industrial polluters using the municipal sanitary sewer system as a conduit for their toxic waste discharges, Regional employees are now empowered to track down and prosecute flagrant abusers of the sewer system, using both the new Regional Sewer Use By-law and the regulations included in section 136 of the Environmental Protection Act. Under the terms of By-Law No. R89-049, a by-law to regulate the discharge of water and wastes into the sanitary, combined and storm sewer system of Hamilton-Wentworth, industrial firms are prohibited from discharging any quantities of PCBs, pesticides, waste radioactive materials, or ignitable wastes, including fuels. Certain elements such as copper, cyanide, arsenic and mercury

are allowed in low concentrations. The By-law also sets maximum limits for TSS, phosphorus, BOD, phenols and temperature. Although concentration limits for organics have not been incorporated into the By-law, additional general clauses ban the discharge of any substance that could adversely affect the health of receiving water bodies. Consequently, virtually any type of undesirable contaminant could be prohibited from being discharged to the sewer.

* Sewage treatment plant audits have been completed for the Dundas (H-W) and Skyway (Halton) facilities, and one is presently underway at the Woodward Avenue facility.

* Step-feed controls have been installed at the Dundas STP (no by-passes to date) and at the Woodward Avenue STP (a 67 % reduction in by-passes has occurred since the modifications).

* Chemical treatment has brought Dundas and Waterdown STP effluents down to or below 0.3 parts per million (ppm) phosphorus.

* The Woodward and Skyway sewage treatment plant effluents regularly meet 0.5 parts per million phosphorus (as opposed to old levels of approximately 1 part per million) because of operating and facility modifications.

* Ammonia discharges from the Woodward Avenue sewage treatment plant has been greatly reduced over the past few years (50 to 70 percent).

3.2.2 Progress on RAP Recommendation #3

Recommendation: *That municipalities and other authorities develop a shoreline management strategy whereby they acquire and develop land for public use, use existing lands under their control, and identify new sites as they become available, in order to provide substantially more physical access to the shores of the Harbour.*

Agencies Responsible

The Regional Municipality of Hamilton-Wentworth, the Regional Municipality of Halton, the Cities of Hamilton and Burlington, the Hamilton Harbour Commissioners, and other organisations involved with land-use planning in shoreline areas.

Progress to Date

The City of Hamilton is presently completing development of the Hamilton Waterfront Park on what was formerly the contaminated Lax Property, and the Pier 4 Park, which is situated just west of the Hamilton Harbour Commissioners' marina and public pier.

3.2.3 Progress on RAP Recommendation #4

Recommendation: *That erosion be minimized through utilizing such measures as conservation, tillage, buffer strips, cover crops, crop rotation and structural controls as necessary.*

Agencies Responsible

The Ontario Ministry of Agriculture and the agricultural associations and organisations are responsible for promoting the programs and actions that will reduce erosion. The farming community will be responsible for actually implementing most of the programs and activities.

Progress to Date

Three provincial and federal programs have been put into place to increase awareness about the agricultural erosion problem and to implement solutions. Farm organisations are now promoting farm audits for environmental concerns and conservation plans in the area.

3.2.4 Progress on RAP Recommendation # 5

Recommendation: *That erosion be minimized during subdivision construction by utilizing best management practices. These management practices must be developed, adopted, and enforced by municipalities and conservation authorities, and that training programs for inspectors and construction site supervisors be established by provincial authorities.*

Agencies Responsible

The Conservation Authorities are to take the lead in coordinating the efforts of all agencies who have a role in reducing erosion from construction sites. The Area Municipalities and the Ministries of Natural Resources and the Environment and Energy must enact and enforce regulations dealing with erosion from construction sites. The Ministries of Natural Resources and the Environment and Energy are also responsible for providing the leadership, policy, and training skills required to aid the construction firms, municipalities, and conservation authorities in developing a much more intensive erosion control program.

Progress to Date

A manual has been drafted by the Conservation Authorities that will provide basic guidelines on erosion control practices for urban development. However, no municipalities in Hamilton-Wentworth have passed soil protection by-laws, and there is still no comprehensive strategy in place to deal with the establishment and enforcement of strict regulations regarding erosion control practices associated with grading and construction.

3.2.5 Progress on RAP Recommendation #12

Recommendation: *Provide an additional 10 km of littoral zone for adult fish along the north and southwest shores of the Harbour including the area of the former Lax property to the Desjardins Canal by creating 5 km of narrow islands and sheltered lagoons.*

Agencies Responsible

The Federal Department of Fisheries and Oceans, the Provincial Ministries of Natural Resources, and Environment and Energy, the Hamilton Harbour Commissioners, and the Jobs Ontario Program will all be involved in the implementation of the program.

Tasks

To implement a program to construct fish and bird habitat in the Hamilton Park areas, along the southwest shoreline, along the north shore and to the northeast and eastern sections of the Harbour.

Progress to Date

Efforts to improve fish and wildlife habitat in Hamilton Harbour and Cootes Paradise have been coordinated through the Fish and Wildlife Habitat Restoration Project, a five-year plan initiated in 1991 to manage the approximately 19 million dollars worth of work to restore the area's biological resources. The project is a partnership involving federal, provincial, regional and local municipal governments, the Hamilton Harbour Commissioners and the Royal Botanical Gardens. Additional groups involved include the Canada Centre for Inland Waters, McMaster University, the Hamilton Naturalists' Club, and many local fishing and boating clubs.

The following projects are associated with the Fish and Wildlife Restoration Project:

Harbourfront Park, Pier 4 and the Hamiltonian Pier is a major area incorporating fish habitat into shoreline protection. Offshore deep water fish habitat was installed in 1993 on a City of Hamilton waterlot and landscaping of Harbourfront has incorporated habitat for shore birds and reptiles. Future planning for the west end of the Harbour will include consideration of fish and wildlife components including; shoreline improvements along the Straughan Channel and the potential for a narrow chain of islands close to the Desjardins Canal adjacent to the CNR railway line.

Project Paradise, on lands of the Royal Botanical Gardens, proposes the restoration of the 250 hectare Cootes Paradise Marsh. A carp barrier will be constructed in 1993/94 at the Desjardins Canal to exclude carp migrating into the marsh from the Harbour and a ten year planting program will follow to re-establish aquatic vegetation. A pike spawning marsh is being enhanced at the mouth of the Grindstone Creek during 1993 as part of a restructuring of the Harbour fishery to include more warm water predator species.

At LaSalle Park, a floating tire barrier has long sheltered this area from wave action, resulting in much clearer water and vigorous plant growth. Fish species and plant life are more diverse here than anywhere else in the Harbour. A new promontory breakwater scheduled for construction in 1994/95 will build on this success, as well as ensuring public access for fishing and wildlife appreciation. Underwater reefs and shoals will add much needed structure for spawning and feeding requirements of the fishery.

The Northeastern Shoreline is exposed to constant wave action, which stirs up the Harbour bottom, preventing plant growth and limiting fish habitat. But there is great potential here for habitat restoration. A system of narrow barrier islands and reefs is proposed to provide space for colonial nesting birds and warm water fish species.

The Hamilton Harbour Commissioners Fishermen's Pier, an island is proposed to be built to provide fish habitat and new public access for fishing. Additional islands at this location could provide nesting habitat for colonial nesting birds.

Windermere Basin, is one of the few sites in the lower Great Lakes that attracts rare nesting birds, such as the relatively rare Common tern. The potential to provide a viewing tower for naturalists is being explored at this site.

Between Carrolls and Willow Points plans propose underwater fish habitat along the north shore of the Harbour after monitoring the success of the first habitat initiatives installed at Harbourfront Park.[3]

3.2.6 Progress on RAP Recommendation #29

To evaluate the potential for, and desirability of, the remediation of contaminated sediments found at the bottom of the Harbour. This would include the establishment of standards for assessing the level of contamination of sediments, for the evaluation of various remediation methods (chemical, biological, incineration, etc.), and the estimation of the effects of contaminated sediment on the quality of water and the health of organisms found in the Harbour.

Agencies Responsible

The Provincial Ministries of Natural Resources, and Environment and Energy, and the Federal Department of Fisheries and Oceans and Environment Canada are responsible for undertaking the research and remediation efforts associated with this recommendation.

Table 1 - Source : John Hall, Fish and Wildlife Restoration Project

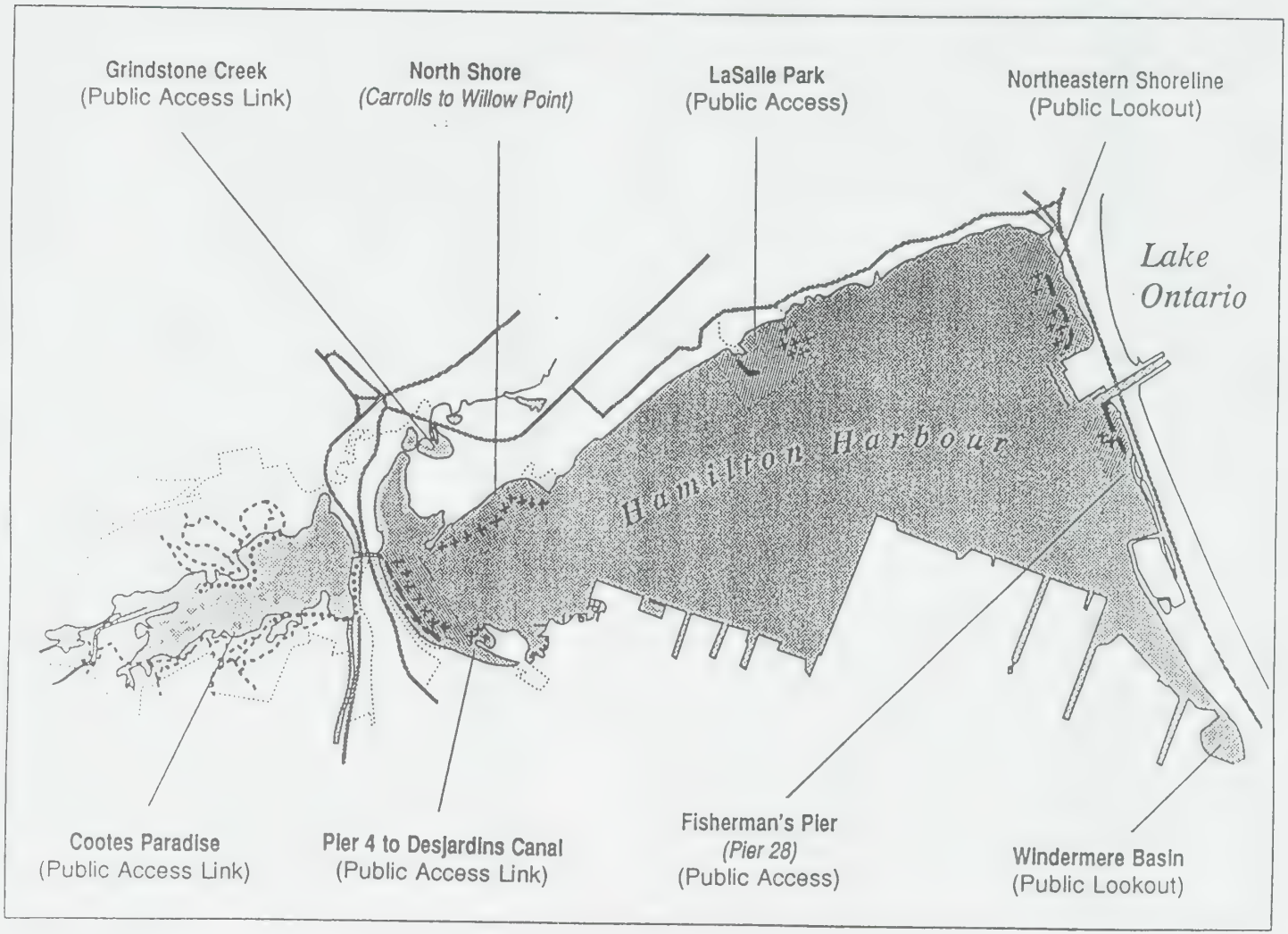

Table 1. **Habitat Targets For the Fish and Wildlife Restoration Project.**

Location	Fish Habitat (ha)	Wildlife (ha)	Littoral Edge (m)	Trails (m)
Cootes Paradise	250.0	250.0	0	2000
Grindstone Creek	20.0	20.0	0	1000
Fisherman's Pier/Pier 28	3.8	0.1	500	0
Northeastern Shoreline (CCIW)	18.4	0.3	2,920	500
LaSalle Park	11.9	0.2	2,340	1,170
Carrolls Point to Willows Point	18.0	0.6	2,550	0
Pier 4 to Desjardins Canal	22.1	0.4	2,600	1,300
TOTAL	**344.2**	**271.6**	**10,910**	**5,970**

Table 2. **Littoral fish community targets for Hamilton Harbour.**

Category	Current	Target
Biomass	300 kg/ha	200-250 kg/ha
Native piscivores	9% of biomass	20-25% of biomass
Spatial variability of biomass	coefficient of variation of 120%	coefficient of variation 70-80%
Native species	37% of biomass	80-90% of biomass
Species richness	4 species/transect	6-7 species/transect

Table 2 - Source : John Hall, Fish and Wildlife Restoration Project

Table 3. Trophic group targets for the littoral zone of Hamilton Harbour.

Category	Current	Target
Piscivore (pike, bass, gar, bowfin, white bass, walleye)	17 kg/ha	40-60 kg/ha
Invertivore (sunfish, rockbass, crappies, alewife, suckers, minnows, white perch, yellow perch)	53 kg/ha	70-100 kg/ha
Omnivore (carp, bullhead, bluntnose minnow, goldfish, quillback, common shiner)	233 kg/ha	30-90 kg/ha
Herbivore (gizzard shad)	6 kg/ha	3 kg/ha

Table 4. Wildlife targets for the Fish and Wildlife Restoration project.

Species	Proposed Target
Double-crested cormorants	200 pair
Black-crowned night herons	200 pair
Ring-billed gulls	reduce to 5000 pair
Common terns	more than 600 pair
Herring gulls	reduce to 350 pair
Caspian terns	more than 200 pair

Table 3 - Source : John Hall, Fish and Wildlife Restoration Project

Tasks

To carry out the investigations necessary and to make the decisions required to proceed promptly with the clean-up of the contaminated sediments in the Harbour. To proceed with the clean-up.

Progress to Date

A number of demonstration projects undertaken to evaluate sediment remediation options have either been completed or are close to completion. Projects undertaken have included[4] :

* An evaluation of the EcoLogic thermal reduction process which took place at Hamilton Harbour in 1991 to determine whether the process, which was developed by a Canadian company, could effectively and economically destroy organic contaminants found in Harbour sediment. Funding was for the project was provided by Environment Canada, MOEE, and Ecologic. Twelve m3 of sediment was dredged from the Harbour for the test, and a temporary site was established next to the Harbour where Ecologic's portable equipment could be set up and utilized. Ecologic's process involves heating the sediments to very high temperatures (but not high enough to incinerate) and injecting hydrogen and nitrogen gases into the mixture while purging all oxygen from the unit.

  The hydrogen in the mixture reacts with organic materials to produce smaller,lighter, and much less toxic molecules. The tests revealed that the process was very effective at removing polynuclear aromatic hydrocarbons (PAHs) andpolychlorinated biphenyls (PCBs) from the sediment, and showed the thermal reduction process to be a viable if somewhat expensive solution to the contaminated sediment problem.

* Ongoing evaluations of processes to oxygenate contaminated sediments using the injection of oxygen and other chemicals into sediments using equipment suspended from a boat. This process was developed for remediating contaminated sediments in areas where dredging and land-based decontamination is not a financially-viable option or where deep waters make dredging difficult. Organic compounds such as PAHs and PCBs will often break down as the result of biodegradation if enough oxygen is present, but sediments such as those found at the bottom of Hamilton Harbour lack adequate levels of oxygen for the contaminants to be broken down in any significant quantities. The National Water Institute is currently testing equipment that injects an oxidizing agent and other chemicals into sediments both in Hamilton Harbour and the St. Marys River.

* A pilot-scale dredging demonstration was carried out in the Harbour in 1992. A "cable arm" dredge bucket was used to collect sediment for the Grace-Dearborn sediment treatment (see next bullet). The purpose of the demonstration was to show that dredging of contaminated sediments can be carried out in an environmentally-sound manner. The cable-arm bucket causes less disturbance of bottom sediments than conventional dredges and releases less sediment to the water column as the bucket is raised. The demonstration was a success in that water quality outside of the dredge area was not degraded and only the desired sediments were removed from the harbour.

* Tests have been completed to evaluate the benefits and costs associated with the biological treatment of contaminated sediments from Hamilton Harbour. Grace-Dearborn Chemical of Mississauga have developed a biological treatment process which has the trademark "Deramend". Funding for the project was provided by Environment Canada, Grace-Dearborn, the Region of Hamilton-Wentworth, the Hamilton Harbour Commissioners, Stelco, and MOEE. Sediments were dredged from the Harbour and placed on a treatment pad, and then mixed with an amending agent, water, and nutrients. The mixture was then tilled mechanically to provide added oxygen to the micro-organisms and to distribute the nutrients and amending agent evenly throughout the mixture. The process proved useful in greatly reducing the PAHs in the sediment.

* A set of bioassays have been developed specifically for Great Lakes sediment. The bioassays have been used on Hamilton Harbour sediment to demonstrate the hazardous nature of the sediment. These tests will be useful in evaluating the state of the Harbour's sediments.

Evaluations are currently underway as to the best means of dealing with the contaminated sediments found at the bottom of Hamilton Harbour. In addition to the remedial options listed above, simply leaving the contaminated sediments in place until covered up by newer, less contaminated layers of sediment and "capping" the contaminated sediment with a layer of inert material are also being considered.

Endnotes

1 Environment Canada, U.S. EPA, MOEE, New York Dept. of Enviromental Conservation, Lake Ontario Toxics Management Plan, pg. 3

2 Remedial Action Plan for Hamilton Harbour, Hamilton Harbour RAP Stakeholders, December, 1991, pg. 4

3 Information provided by John Hall, Fish and Wildlife Restoration Project

4 Information provided by Craig Wardlaw, Westwater Technology Centre

Water - Information Sources

Environmental Services Department, Region of Hamilton-Wentworth , unpublished information

Environment Canada, U.S. Environmental Protection Agency, Ontario Ministry of the Environment and Energy, New York State Department of Environmental Conservation, Acomplishments Toward the Reduction of Toxics, September, 1993.

Environment Canada, U.S. Environmental Protection Agency, Ontario Ministry of the Environment and Energy, New York State Department of Environmental Conservation, Lake Ontario Lakewide Management Plan : Workplan, 1993.

Environment Canada, Keith Rodgers, unpublished data

Environment Canada, U.S. Environmental Protection Agency, Ontario Ministry of the Environment and Energy, New York State Department of Environmental Conservation, Lake Ontario Toxics Management Plan : Workplan, 1993.

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Hamilton Harbour Remedial Action Plan Office, Progress Report - Implementation of the Hamilton Harbour Remedial Action Plan, 1993.

Hamilton Harbour RAP Stakeholders and Technical Team, Remedial Action Plan For Hamilton Harbour, December, 1991.

Wastwater Technology Center, Craig Wardlaw, unpublished information.

4 Land

4.1 Habitat: Flora and Fauna

Historically, there have been no comprehensive provincial or federal policies or programs to deal with the preservation and enhancement of natural areas in Ontario. Both the provincial and federal governments have enacted legislation and put into place programs that in one way or another have major impacts on the state of natural ecosystems, but there is no overall framework that guides the preparation or implementation of government policies or programs. Most policies or programs geared towards the protection of the environment are related to specific human activities that encroach on, disturb, or damage existing ecosystems. For instance, the Ontario Water Resources Act, the Environmental Protection Act, and the Environmental Assessment Act impose restrictions on activities that can adversely affect lakes, rivers, important natural habitat, and other natural resources.

The province also provides some level of protection to natural systems through restrictions on land-use policies. Although land-use control in general is left to the lower and upper tier municipal governments to manage, the province has become involved with specific types of land-use decisions at the local level using the powers granted to the Ministry of Municipal Affairs and other ministries by the Planning Act. One of the ways that the province can affect local land-use decisions is the issuance of policy statements and guidelines. Policy statements are legally-binding declarations of provincial policy that must be adhered to by both regional and Area municipalities, as provided for by under the Planning Act. Guidelines produced by the various ministries also set out provincial policy, but carry less weight than the policy statements and do not necessarily have to be adhered to by municipal governments when making land-use decisions.

In the past the province has been reluctant to use policy statements very often, and the only major environmental policy statement issued to date has been the Wetlands Protection Policy, which prohibits new developments in provincially significant wetlands. Provincial ministries such as the Ministry of Natural Resources and the Ministry of the Environment and Energy have generally tended to rely on published guidelines and their ability to comment on individual land-use change applications to implement provincial environmental objectives when dealing with land-use regulations. However, in response to the recommendations of the Commission on Planning and Development Reform in Ontario (commonly known as the Sewell Commission), the Province has circulated a draft set of policy statements that if implemented could have a profound impact on the environmental aspects of land-use planning.

In Hamilton-Wentworth, the Region has had a number of policies in the Official Plan related to environmental issues since the existing plan was adopted in the mid-1970s. Among these policies were restrictions on development in areas designated as Environmentally Sensitive Areas and Hazard Lands. The Area Municipalities were required to utilize conservation authority mapping of fill and flood lines to establish hazard land designations where development would be prohibited, and developers/landowners who wished to obtain changes

in land-use in areas designated as Environmentally Significant Areas had to provide environmental impact statements detailing proposed changes and impacts, or obtain a special waiver from Regional Council.

Thus, in terms of new programs/policies/activities that could affect natural habitat in Hamilton-Wentworth, three recent developments merit a detailed description - the new Provincial Wetlands Policy Statement, the new environment policies included in the draft Regional Official Plan, and the proposed Provincial Natural Heritage, Environmental Protection and Hazard Policies.

4.1.1 Provincial Wetlands Protection Policy

On May 14, 1992 the Lieutenant Governor in Council approved the Wetlands Policy Statement issued by the Minister of Municipal Affairs and the Minister of Natural Resources. This Policy, prepared under the authority of Section 3 of the Planning Act, replaced existing guidelines used by the Ministry of Natural Resources and gives direction to municipalities, public agencies, planning boards, and others on the protection of wetland areas. All municipalities, including the Region of Hamilton-Wentworth and the six Area Municipalities comprising the Region, must ensure that their land-use plans conform to the requirements of the Policy Statement and must refuse applications for land-use changes that contravene the intent of the Policy.

Regarding the protection of wetlands in Great Lakes - St. Lawrence Region (of which the Region is deemed to be part of), the Policy Statement states the following:

2.1 Development shall not be permitted within Provincially Significant Wetlands.

2.2 On adjacent lands, development may be permitted only if it does not result in any of the following:

a) loss of wetland functions;
b) subsequent demand for future development which will negatively impact on existing wetland functions;
c) conflict with existing site-specific wetland management practices; and,
d) loss of contiguous wetland area.

This will be demonstrated by an Environmental Impact Study (EIS), prepared in accordance with established procedures, and carried out by a proponent addressing a) to d) inclusive.

2.3 On adjacent lands, established agricultural activities are permitted without an EIS. [1]

Provincially significant wetlands are those that are deemed to be class I, II, or III according to criteria established by the Ministry of Natural Resources. According to the Policy Statement, "adjacent lands" are those lands within 120 metres of the wetland area or those lands that connect wetlands which are part of a "wetland complex". Development is defined as including

the construction, erection or placing of a building or structure as well as site grading, excavation, removal of top soil or peat, or the dumping of fill. As a result, virtually all types of alteration of the landscape will be prohibited in those wetlands that have been identified by the province as being significant. Proposed construction, grading, and filling in areas next to wetlands will in many cases also be subject to review to ensure that the changes would not lead to a degradation of the adjacent wetland.

4.1.2 Draft Official Plan Policies

In September, 1993, the Hamilton-Wentworth Planning and Development Department released a draft Official Plan that included a number of proposed changes to environmental policies related to land-use planning. One of the major proposed changes is the alteration of the existing Environmentally Sensitive Areas policies.

The existing Official Plan policies require that proposed land-use changes in ESAs should only be permitted once an environmental impact statement has been prepared or Regional Council has given a waiver to the proponent. The areas designated as ESAs were identified and delineated by the 1976 Ecologistics Study, which provided the baseline information on the natural resource features found in each particular area. When proponents of development in ESAs submit an environmental impact statement, the statement is supposed to describe in detail both the current state of the area (as compared with that provided in the 1976 ESA study) and the ways in which the rare and special attributes will be preserved and/or protected during and after development.

Under the provisions of the draft Official Plan, Environmentally Sensitive Areas would be renamed as Environmentally Significant Areas, and proposed changes to land-use in ESAs would be referred to a Environmentally Sensitive Areas Impact Evaluation Group (ESAIEG) for review. The Environmentally Significant Areas designation would be based on the data collected by the 1993 Natural Areas Inventory instead of the 1976 Study, and the geographic boundaries and evaluation criteria associated with the ESA designation would change as a result. According to the draft plan:

Land use changes in or adjacent to Environmentally Significant Areas will only be permitted where in addition to meeting other policies in this plan, such development:

i) will not adversely affect, degrade or destroy any of the qualities which served as the basis for the area's designation;

ii) will not cause any significant impacts upon water quality and quantity; and,

iii) will not adversely affect the implementation of any resource protection policies or plans. [2]

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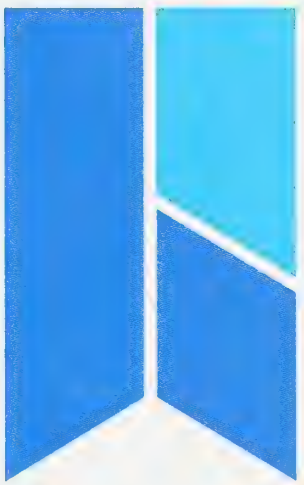

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Thus, according to the draft Official Plan, each time a developer/landowner would seek approval for a land-use change (e.g. zoning by-law revision, official plan amendment) in location within an Environmentally Significant Area, he or she would have to submit information to a group of environmental experts who would review the proposal. The group, called the Environmentally Sensitive Areas Impact Evaluation Group (ESAIEG), would advise the Regional Planning and Development Department on whether or not the proposed changes would adversely affect the special features identified at the site by the 1993 Natural Areas Inventory, and would recommend one of the following actions to the Region: allowing the project to proceed unconditionally, allowing the project to proceed subject to specific conditions, or refusing to permit any changes. The draft Official Plan requires that no decisions on proposed changes would be made until the ESAIEG had evaluated the proposed changes and provided a recommendation, so that an Area Municipality or Regional Council decision would not be made until a full environmental review of the proposed change had been made.

4.1.3 Draft Provincial Natural Heritage, Environmental Protection and Hazard Policies

In December, 1993, the Ministry of Municipal Affairs circulated a consultation paper called A New Approach to Land Use Planning to municipalities and other organisations for comment. The document is largely the result of the findings of the Commission on Planning and Development Reform in Ontario, which advocated a much more important role for municipal land use planning in protecting the environment. The consultation paper proposes using the Province's powers under the Planning Act to issue policy statements to require municipalities and other planning agencies to *protect the quality and integrity of ecosystems, including air, water, land, and biota.* If the Province issues policy statements of the type provided in the consultation document, it will be more difficult and in some cases impossible to obtain land-use approvals for new developments in areas that have significant environmental features.

More specifically, the draft comprehensive policies for natural heritage, environmental protection, and hazard policies state:

1.1 Development may be permitted only if the quantity and quality of water in ground water and surface water systems are not adversely affected.

1.2 Development will not be permitted in significant ravines, rivers, streams, and natural corridors, and in the habitat of endangered, threatened and vunerable species. Development will not be permitted in significant woodlands south and east of the Canadian Shield. Development will not be permitted on adjacent and related lands if it adversely affects the integrity of the natural features or ecological functions of the new areas included in the statement. New infrastructure will be located outside these significant features unless it is demonstrated that there is no reasonable alternative.

1.3 Except for areas covered in policy 1.2, areas of natural and scientific interest, ground water recharge areas, significant wildlife habitat, and shorelines will be classified into areas where either (a) no development is permitted or (b) development may be permitted only if it does not adversely affect the features and functions for which the area is identified.

1.4 Except for areas covered in policy 1.2, development on lands adjacent to lakes, rivers, and streams may be permitted only if it does not adversely affect water quality, shoreline vegetation, bank stability, and wildlife habitat.

1.5 Development may be permitted if it does not harmfully alter or destroy fish habitat, either directly or indirectly. There will be no net loss of fish habitat within the same watercourse, a net gain of productive capacity in fish habitat wherever possible.

1.6 In decisions regarding development, every opportunity should be taken to maintain the quality of air, land, water, and biota; maintain biodiversity compatible with indigenous natural systems; and protect natural links and corridors. The improvement and enhancement of these features and systems are encouraged. [3]

4.2 Waste Management

In 1992 the Region's former Engineering Department underwent a restructuring to better position the Region to deal with the changing needs and demands of environmental programs, regulations and planning. This led to the creation of the Environmental Services Department and the Waste Management Division. The restructuring further recognized the relationship between solid and liquid waste and created a common administration to deal with both aspects. Regional activities with respect to liquid waste, such as Sewer Use Control and the Regional Laboratories, are discussed under the Section of this report entitled "Water".

The storage, elimination or disposal of municipally-collected solid wastes is the responsibility of the Region, and as a result Hamilton-Wentworth maintains a number of services and operations related to waste management. The Region of Hamilton-Wentworth has attempted to address the problem of waste disposal by preparing long-range plans to deal with waste produced within the Region's boundaries and by setting up, or supporting, various organizations and processes to reduce the need for landfilling. However, waste management initiatives by the Region can only address certain aspects of the problem. A cooperative effort between industry, commerce and citizens is necessary to ensure that waste is reduced, that feasibly recyclable materials are recycled, and that hazardous materials are diverted from the waste stream to reuse, recycling or, at the very least, to the most environmentally acceptable means of disposal.

The Region's direction on waste management is described in the final report of the Regional Chairman's Task Force on Sustainable Development, which was adopted by Regional Council in February of 1993. The first of two documents that comprise the final report Implementing Vision 2020 is entitled Directions for Creating A Sustainable Region. The focus of Vision 2020 is the "virtual elimination of waste rather that on the management of waste after generation." The second document is called Detailed Strategies and Actions Creating A Sustainable Region, and outlines specific strategies to reduce waste. These include the promotion of user

pay garbage collection systems, advocacy of the product stewardship cost sharing model, and institution of mandatory recycling.

Clearly, the Region shares the view that responsibility for the proper management of waste rests primarily with people who purchase and consume products that generate garbage in the first place, and the producers of those products and packages. The convenience and successful marketing of a disposable lifestyle has become an expensive problem, the costs for which have been borne by municipalities with some help by the provincial government and even less assistance from the private sector.

Although advances in recycling technology and manufacturing processes that use less primary resources may help reduce overall levels of garbage directed to landfill, municipal waste management and diversion programs are expensive. The Region, through the Economic Development Department, has attempted to foster local activity in the area of recycling technology.

No matter how efficient waste management systems may be, all municipal programs, facilities and systems benefit from waste reduction and the related reduction of the cost burden resulting from use of the system. This can only be achieved when consumers reject excessive packaging and select durable goods. The concept of product stewardship, which has been advocated in principle by Regional Council, addresses waste reduction by incorporating the cost of disposal or recycling in the package, hence allowing previously hidden costs to be considered in the purchasing decision.

4.2.1 Provincial Legislation: 3Rs Regulations

In March, 1994, Minister of the Environment and Energy (MOEE) Bud Wildman announced the passage of new waste reduction regulations, referred to as the 3R's Regulations, into law. The 3R's Regulations will define the mandatory rules and requirements for reduction, reuse and recycling activities in Ontario. The compliance date for municipalities in southern Ontario will be January 1, 1995.

The regulations require:

- Residential recycling and backyard composting programs for all municipalities with populations of 5,000 or more.

- Leaf and yard waste composting programs for municipalities of 5,000 people or more where leaf and yard waste collection programs are already in place (Dundas), and for all municipalities with populations of 50,000 or more (Hamilton and, by the compliance date of January 1, 1995, Stoney Creek). Although the regulation benchmarks for population refer to local municipalities, other municipalities in which a local municipality is located are obliged to cooperate with the local municipality in its efforts to fulfil its obligations under the regulations. This means that the Region must play an active role in the establishment of required programs if so requested by the affected area municipalities.

Although the Region has been offering a backyard composting program since 1990, the program was cancelled in 1993 due to budget restraints. The regulation will require the Region to reconsider this program. The regulation has no annual benchmark for either composters distributed or compostable waste diverted from landfill. It simply requires that a backyard composting program, regardless of whether or not the composters are subsidized, be available to residents through a municipally operated program.

- Designated industrial, commercial and institutional (IC&I) waste generators must conduct annually updated waste audits. They will also develop and implement waste reduction workplans and initiate recycling programs. This regulation will impact the Region as it would any other business. In the case of the Region, however, all office space is leased, and the responsibility for meeting the regulations lies with the various building owners.

- Major packaging users will conduct packaging audits which will be updated every two years. Packaging reduction workplans will be required.

In addition, recycling facilities may be eligible for exemptions under the Environmental Protection Act when the facility meets standards set out under the Regulations.

Of the 3Rs Regulations, the Leaf & Yard Waste Systems section of the Recycling and Composting of Municipal Waste Regulation has the greatest impact on this Region and its area municipalities.

The Region is required to meet the January 1, 1995 compliance date. It is estimated that the Region would incur gross operating costs, in addition to the existing Laidlaw Agreement, of $400,000 to $1,000,000 per year and capital costs of approximately $2,000,000 for equipment purchases, site preparation, and transfer station modifications.

The Region's ability to meet the requirements of the provinces 3R's Regulations will be hampered financially by the constraints of the existing waste disposal system contractual arrangement until January 1996, when it is anticipated that a newly awarded contract will come into effect. For this reason the Region had requested that the Province give consideration to extending the compliance date from July 1, 1994 to January 1, 1996.

4.2.2 Provincial Legislation: Bill 7

Bill 7 amends the Municipal Act, the Regional Municipalities Act, the Region of Hamilton-Wentworth Act (and 12 other Regional, District or County Acts) and the Municipal Affairs Act, clarifying municipal powers with respect to "3R's" (Reduction, Reuse, Recycle) and other waste management activities, which were not previously defined in the various Acts.

Bill 7 - **The Municipal Statute Amendment Act** - clarifies and increases municipal powers with respect to waste management. Whereas the 3R's Regulations stipulate what must be done, Bill 7 addresses who in fact has the waste management authority to meet these regulations.

Under amendments to the **Municipal Act**, municipalities will have the power to:

- establish and operate facilities for all waste management activities (collecting, reducing, reusing, recycling and waste disposal);
- require source separation of waste and recyclables and establish user fees and incentives for waste reduction;
- enter property to conduct surveys and soil tests for waste management purposes, with appropriate safeguards for property owners' and occupants' rights; and
- market products made from waste materials.

Under amendments to the **Regional Municipalities Act**, the Regional Municipality of Hamilton - Wentworth will be able to assume all aspects of waste management based on the following requirement:

- in regional municipalities where regional councillors also sit on local councils, a waste management function can be assumed if a majority of regional councillors representing a majority of local councils vote in favour of the assumption.

The **Regional Municipalities Act** amendments also require regional municipalities which currently have waste disposal authority (as is the case in Hamilton-Wentworth) to assume all waste reduction powers with the exception of collection within three years or they are deemed to have assumed that authority as of January 1, 1997. This does not prevent the Region from assuming all waste management powers, including collection, prior to January 1, 1997.

Amendments to the 13 **Regional Acts** provide regional municipalities which currently have waste disposal responsibility with expanded 3Rs powers and broadened waste disposal authority. These powers are the same as the ones provided to local municipalities by virtue of amendments to the Municipal Act.

4.2.3 Regional Waste Reduction and Diversion Programs

i) The Household Hazardous Waste Program

Materials such as paint, antifreeze, turpentine, batteries, smoke detectors, disinfectants, rodent poisons, insecticides, used motor oil, polishes and paint thinners, and oven cleaning solutions should not be mixed with solid wastes. Seemingly small quantities of common materials collectively represent a large quantity of hazardous wastes that could potentially

produce a toxic brew as the chemicals mix together with rain water and then seep into nearby groundwater. Leachate collection systems are now a standard feature of new landfill sites, however these leachates must then be dealt with as toxic waste.

The Region's Household Hazardous Waste Program provides residents the opportunity to dispose of dangerous chemicals, oils and various paints without mixing these substances into their garbage or into nearby sewers. This program is operated on behalf of the Region under contract by Hotz Environmental Services, and is open every Saturday of the year from 9am to 5pm. The depot is located at 239 Lottridge Street, Hamilton (north of Barton, between Gage and Sherman).

8,706 residents used the facility in 1992, an increase of 8% over the 8,052 participants in 1991. A total of 176,256 litres of hazardous wastes were diverted from improper disposal in 1992 compared to 171,433 litres in 1991. The establishment of a permanent depot with regular hours has proven to be an improvement over the single-day event style of program held in previous years. In 1989 the six single-day household hazardous waste day events diverted about 257 drums of hazardous wastes as compared to about 1400 drums collected in 1992. In addition over 10,000 units collectively of things like batteries and propane tanks were also received at the depot in 1992.

Regrettably, a successful household hazardous waste program is very expensive. The six programs held in 1989, for instance, were operated at a cost of just over $160,000.00. The Region paid $140,000 of the total while the Ministry of Environment and Energy contributed $20,000. The 1992 permanent depot system, in contrast, cost the Region over $716,000 to operate (add an additional $35,000 for promotion) to which the province contributed $15,000. To sustain the household hazardous waste programs it is most critical that some sort of product stewardship cost-sharing scheme be introduced. The threat of toxic pollution, however, does not seem to be a strong priority at the provincial level - as evidenced by the funding available to household hazardous waste programs - and current discussions regarding a broad-based product stewardship model do not include hazardous wastes.

Meanwhile, the cost of these programs escalate proportionately with the volume of materials collected. In other words, if the cost of serving 8,700 households (about 5% of the households in the Region) in 1992 was $716,000, then the cost of getting participation from 87,000 households (50%) would be over $7 million! Clearly the only feasible approach to the problem is to eliminate the need for municipally funded programs by, ideally, eliminating the generation of hazardous wastes, and secondly placing responsibility for program funding on producers and consumers of hazardous products.

ii) Small Quantity Hazardous Waste Generators

The improper disposal of hazardous wastes is a problem that is not solely confined to households of the Region. There is a large potential for improper disposal by medium to small business who, by virtue of limited volumes are not subject to regulation and at the same time have difficulty locating appropriate and inexpensive management options for these wastes. For this reason the Region assumed an active role in a Federal pilot project, conducted in the

Region, to quantify the problem and to participate in the drafting of a management plan.

During the course of the study, which included extensive but confidential surveys of selected local small to medium business, it was discovered that current legislation is a barrier to the proper management of small quantity hazardous wastes. A small business operator, unlike a resident, is not permitted to transport these wastes without a licence - in essence the business person can not put the minimal quantities in the trunk of their car and deliver these wastes to a properly licensed site.

Collectively, what appear to be minor sources of hazardous wastes in fact add up to a significant problem, and a lack of understanding by business people regarding the proper handling of these wastes can have serious negative impacts on both the solid and liquid waste systems as hazardous wastes are often disposed of in the garbage or down the sewer.

Legislative barriers, then, add yet another level of difficulty when trying to encourage proper disposal habits, and for this reason Regional officials, along with representatives of the Federal Government, Cave and Associates (who were conducting the project), and local MOEE officials represented to the province a concern with the current legislation and its potential to be a barrier to positive environmental action.

In general there is a great deal to be done to obtain compliance, and the Region continues to work with the business community to reach its goals.

iii) Blue Box Recycling Program

Curbside Recycling has been developing in the Region since 1977, initially through the efforts of Hamilton-Wentworth Third Sector Employment Enterprises. Third Sector is a non-profit company which collects and processes recyclable materials while providing youth employment through its social services program.

The area municipalities and the Region began contributing financially to the recycling program in 1985 in the form of a diversion credit for materials collected and for the purchase of blue boxes and other recycling equipment. Regional involvement progressed and, effective January 1, 1990, the Region assumed full financial responsibility for the Blue Box recycling program. A full service recycling agreement between Third Sector Recycling and the Region was established beginning June of 1991.

In 1992 the Region paid approximately $2.7 million dollars to Third Sector Recycling for the collection, processing and delivery to market of almost 19,700 tonnes of recyclable materials collected from 150,000 households in the Region. The list of materials eligible for recycling through the program has grown to include the following: Newspapers, magazines, telephone books, corrugated cardboard, glass bottles and jars, metal food and beverage cans, plastic grocery bags, plastic jugs and bottles, and aluminum foil trays and plates.

It was at one time felt that recycling programs in general would, due to the high costs of disposing of wastes in landfills or through incineration, become the logical means of waste elimination both from a financial as well as environmental viewpoint. It was recognized, however, that just as traditional waste disposal methods do not pay their own way, recycling programs too might never operate on a full cost-recovery basis. Whereas it was hoped that material revenues would offset a large portion of program expenses, the reality to date has been that the revenues for recyclables have remained flat and in some cases fallen, causing recycling to remain an expensive waste management option.

For this reason the issue of product stewardship is most actively discussed as a result of a debate as to who should be paying for recycling. When the Region first entered into the Recycling Agreement, the intention was for the Region to provide the capital equipment necessary to do an effective job. In 1991 the Region purchased seven recycling vehicles and a large baler for lease back to Third Sector. The rationale was to take advantage of start-up capital funding from the Ministry of Environment and Energy and OMMRI (Ontario Multi-Material Recycling Inc.), the latter being a funding arm of those industries attempting to divert specific materials from the waste stream.

Unfortunately fiscal difficulties brought on by the recession, and the significant decline in tipping fee revenues combined with the fact that the Region's program was already beyond the start-up point and was therefore not eligible for provincial funding, has caused severe limitations on funding for the program. As a result, it was not possible for the Region to maintain the capital purchasing program originally foreseen when the agreement between the Region and Third Sector was signed. Capital budgets for recycling were cancelled in 1992 and 1993, and a new approach had to be taken in which Third Sector will lease required vehicles directly from the supplier.

iv) Backyard Composting Program

The Region, from 1990 through 1992, has been offering a subsidized backyard composter distribution program. When the program was originally offered, funds covering 50% of the composter unit cost were available from the Ministry of Environment and Energy and Energy (MOEE). The financial partnership was then 50% MOEE, 25% Region, and 25% participating householders, who could purchase a composting unit for $15. Distribution of composters occurred in two ways: pick up days at various locations throughout the Region were established for those who had indicated that this was the preferred option, while others chose to receive their compost unit via courier. Many of those who had indicated that they were willing to pick up their composter in fact did not do so, and an evaluation of the two methods revealed that direct delivery to the participant's home by courier was most cost-effective.

By 1992 the Region had distributed over 25,000 backyard composters. Two studies conducted in the Region revealed that 97% of the residents that had purchased composters through the Region's subsidized composter program were still using their composters, and that compost units divert approximately 219 kilograms of waste per participating household per year from the Region's waste stream. These studies indicate that the Region's Home Composting Program, with participation from just over 25,000 residents, diverts over 5,300 tonnes of

material from landfill each year. This represents about 3.5 percent of the total annual municipal waste stream: if all of the approximately 125,000 households in the Region with backyards practised backyard composting over 26,500 tonnes or 17.5 percent of the waste stream would be diverted.

Regrettably, even though the MOEE increased its contribution starting in 1991 to cover 2/3 of the unit cost, the capital, distribution and program administration costs that would be paid out by the Region before costs could be recovered were substantial. This program, therefore, was cancelled in 1993, when funding was removed from the Waste Management Capital and Current Budgets. As with other waste reduction programs, fiscal difficulties conspired against the program as the waste management budget was reduced by 25% in 1993. It will be necessary to reconsider the program given the 3R's Regulations proposed by the province.

v) Public Education

The Region's public education activities with respect to waste management are intended to foster waste reduction behaviour and to promote proper use of existing programs and facilities. The Region's Environmental Services Department publishes twice-annually a newsletter entitled "Waste Management - A Citizen's Guide". This newsletter contains materials that provide program information as well as waste reduction tips and rationale. It serves the broad mandate of the Waste Management Division, which is responsible for the management of solid and liquid wastes (sewer use control) within the Region.

In addition, the Department publishes a number of program oriented information brochures, and uses paid and free advertising, where available, to promote waste diversion programs. Although fiscal constraints affect the Region's public education budget, every effort is made to advance waste reduction and diversion within the community. Significant staff time is dedicated to making presentations at schools, service clubs, church groups and special interest groups, and a static display is used for various fairs and shows.

vi) Comprehensive Municipal Pollution Prevention (CMPP)

The Region is undertaking a Comprehensive Municipal Pollution Prevention Project in co-operation with the Federal and Provincial governments. The goal is to set out an action plan for the Region to incorporate pollution prevention into its daily activities. The end result of the project will be an interdepartmental and interdisciplinary Management Plan that will outline pollution prevention goals and strategies to achieve these goals.

Pollution prevention means better resource management and conservation as well as eliminating pollution at the source. The Project will achieve this by following a waste management hierarchy

that concentrates on the efficient use of resources and reducing the toxicity and amount of waste generated rather than on waste disposal. Goals and strategies outlined in the Plan will be integrated into the Region's structure and, where necessary, staff will be trained to implement the strategies developed. The plan will be developed into a generic form that can be used by other communities as an environmental planning tool.

Regional Council approved the Project in September 1993 and subsequently a Memorandum of Understanding (MOU) for the Project was signed by Environment Canada, the Ontario Ministry of Environment and Energy, and the Regional Municipality of Hamilton-Wentworth. The MOU commits each level of government to contribute $170,000 to the Project over a two year period for a total of $510,000.

4.2.4 Private Sector Waste Management Activities

i) Private Sector - Regional Cooperation

Although the public sector is primarily responsible for waste disposal and recycling in the Region, a number of important activities are carried on by the private sector. There are four privately licensed landfill sites in the Region. Scrap yards, the beverage producers and numerous other private sector industries are heavily involved in the recycling of materials such as newspaper, glass bottles, plastics, metal cans, corrugated cardboard and old cars that would otherwise be considered waste. The Region has always encouraged a partnership between the public and private sectors in the proper management of all wastes. To this end the Environmental Services Department in 1992 produced a "Waste Management and Recycling Directory" to assist companies in their efforts to reduce or divert waste from disposal. The information in the directory is occasionally updated with new entries. Staffing prohibits Waste Management Division staff from offering comprehensive waste audit consultations with business, but there remains a strong interest by the Region in industrial, commercial and institutional waste reduction activities. The Region, therefore, participates in many forums where it can advocate changes or counsel initiatives that will help private business with environmental compliance.
The Region, through efforts by the Economic Development Department, also hosts a symposium called Business Opportunities in the Environment, which includes in its two day agenda sessions on compliance as well as offering excellent opportunities for networking for business people who are looking for others with common problems, goals, or for those who may be able to provide solutions.

ii) Steetley Landfill Proposals

Perhaps the most controversial aspect of the private sector initiatives in the waste management business is the operation of landfills. While private sector efforts to manage wastes through recycling are almost universally well-received by the public and various levels of government, the management of landfills by profit-motivated firms is rarely accepted by environmental groups or members of the public as being an activity beneficial to the local community.

Brow Landfill Site

One such controversial private-sector landfill that has been in the public eye in recent times has been the Steetley Industries proposal to change the contour of its brow landfill site. If approved the proposal would allow for a greater volume of waste to be landfilled at the site than was allowed under the initial Certificate of Approval issued by the Ministry of Environment and Energy.

The Escarpment Brow Landfill Site is in the Town of Flamborough, and located just above the escarpment near the boundary with Dundas. In 1989, Steetely voluntarily closed the site and sent the Ministry of the Environment a closure plan that proposed filling the existing 'V' sloped trough with waste and covering the total landfill with a dome-shaped cap. This met with objections and as of the end of 1993 no environmentally-acceptable closure of the site had taken place. Leachate from the landfill site is currently discharged to Regional sewers and is treated at the Dundas sewage treatment plant.

South Quarry Landfill

Steetley Quarry Products Inc. proposes to develop a 78 hectare non-hazardous industrial landfill with a life-span of about 13 years. The proposed landfill would be on the 135 hectare South Quarry site close to the existing Brow Landfill Site but on the North side of Highway 5.

This site would be one of the largest of its type in Canada. According to the proposal, residential and industrial waste will be accepted at the proposed facility from sources outside the Region and from the Greater Toronto Area. Given that Steetley has another 200 acre quarry just to the North, there are fears that if this proposal is successful the North Side Quarry will also be proposed for use as a landfill. The project requires the preparation and approval of an Environmental Assessment (E.A. Act Section 34 (b)). This assessment includes social noise, traffic, dust and other environmental impacts. On September 12, 1989, Steetley released a draft E.A., "Steetley South Quarry Landfill Development Draft EA", for review by local residents, interest groups and authorities.

Regional Council has objected to the undertaking by Steetley and has hired a lawyer to represent the Region at the hearings. Based on an examination of the Draft EA the Hamilton Region Conservation Authority is at this point opposed to the proposal. Two citizens groups are fighting the proposal, Greensville Against Serious Pollution (GASP) and a newly formed group. GASP has been told by the Board to share the intervenor funding granted to the Town of Flamborough. A public liaison committee (PLC) has been formed in co-operation with the Towns of Flamborough and Dundas and includes members from various local agencies including the Region.

The Environmental Assessment process, for which hearings are currently under way, offers opportunities for public involvement. However, the positions of the Municipalities on the various issues involved will likely be presented by lawyers and argued through expert testimony at the hearing. In the past, the Region has generally supported private operations that deal with local non-hazardous industrial waste since this is an important component of an overall waste management strategy and Glanbrook does not accept such waste. On the other hand, this proposal by Steetley incorporates the acceptance of residential waste from far afield, a position which Regional Council does not support.

iii) Other Private Activities

Steetley is not the only corporation with a landfill proposal currently under consideration. Taro Industries have also proposed the development of a landfill at a quarry site. In general a strong presence by private sector waste management interests has been established in the Region complementing the Region's waste management system.

There are now in place numerous private transfer and processing sites for waste, recycling industries and waste haulers in the Region competing for the feedstock of materials and wastes generated as part of the Region's overall waste stream. Competition in the private sector has established economical disposal alternatives for wastes which have been deemed unacceptable at the Region's facilities (construction and demolition debris, inert materials, old corrugated cardboard, etc).

Many of the private sector initiatives support the 3R's philosophy by processing or diverting wastes to sources other than a landfill site. There are however, private sector enterprises who are providing an inexpensive disposal alternative to the Region's landfill site but negating the 3R's philosophy. These companies are exporting wastes to landfill sites within the United States which have extremely low tipping fee rates, therefore deterring the economic incentives normally associated with the 3R's philosophy.

Endnotes

1 Ontario Ministry of Municipal Affairs and Ontario Ministry of Natural Resources, Wetlands Policy Statement, 1992.

2 Planning and Development Department, Region of Hamilton-Wentworth, Hamilton-Wentworth Region Official Plan (draft), September, 1993.

3 Ontario Ministry of Municipal Affairs, A New Approach to Land Use Planning : A Consultation Paper, December, 1993. pg. 7

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